

# INVENTIONS & INNOVATION

## Success Story



### IMPROVED POURED CONCRETE WALL-FORMING SYSTEM

#### Innovative System for Pouring Concrete Walls and Foundations Achieves an R-22 Insulating Barrier

##### Benefits

- ◆ Achieves an R-22 insulating barrier for basements and crawlspaces by leaving the forms in place after pouring
- ◆ Allows the business or homeowner to reduce heating and air conditioning load
- ◆ Saves 10 million Btu per year for a typical installation
- ◆ Has saved 0.45 trillion Btu from all installations nationwide, representing 28,000 tons of avoided CO<sub>2</sub> emissions and \$2.3 million in avoided energy purchases from 1994 through 2000
- ◆ Could save 3 trillion Btu nationwide through 2010

##### Applications

A method for pouring concrete foundations and walls for residential and commercial buildings using rigid insulation board for each side of the concrete form.

"The I&I grant allowed Lite-Form to convince builders that customers will pay the higher price for superior energy performance and construction results in areas where insulated basements are valued."

— Patrick Boeshart  
Inventor  
Lite-Form International

Building a house or business with a basement or crawlspace requires a strong foundation, which, in turn, generally involves using poured-in-place concrete. Poured-in-place concrete foundations are constructed by pouring wet concrete between forms made of plywood or other material. These forms maintain the wall's structural integrity until the concrete is fully cured but offer no insulating value if left in place. Typically, they must be disassembled and transported to the next job site or to a landfill when the job is over.

With assistance from a U.S. Department of Energy's Inventions and Innovation Program grant, Patrick Boeshart, inventor of the Lite-Form® Concrete Wall-Forming System, conducted demonstrations of the system using highly insulative polystyrene forms. The technology has been commercially available from Lite-Form International since 1994. In January 1998, Owens Corning introduced a concrete form system that uses the Lite-Form plastic components under the name PINKFORM XTRA. Licensees include Georgia Foam, Mid-Atlantic Foam, and others. Independent builders can also purchase a machine to manufacture the forms at the job site.



Lite-Form Wall



As the photo shows, workers assemble the interchangeable inside and outside forms using a patented system of ties. Concrete is then poured in the space between the forms. Once the concrete cures, the forms can be left in place to provide up to R-22 insulation for the walls or foundation. Leaving the forms in place reduces noise attenuation, moisture damage, and radon gas contamination in basements and avoids expensive disassembly and transport to the next job site or to a landfill.

## Energy Savings and Pollution Prevention

At R-22, a typical basement (about 2500 square feet of wall) constructed with the Lite-Form System saves about 10 million Btu per year. Lite-Form Systems have been used for almost 40 million square feet of walls in buildings across the United States.

Using an estimate of 4000 Btu saved per square foot of installed wall, the Lite-Form System saved almost 0.15 trillion Btu annually in the United States in year 2000. Since 1994, the cumulative energy savings total about 0.45 trillion Btu. The associated cumulative reduction in CO<sub>2</sub> emissions from avoided energy generation is estimated to be 28,000 tons. Cumulative saving for avoided energy purchases totals over \$2.3 million in inflation-adjusted 1999 dollars.

## Market Potential

The Lite-Form System is protected under U.S. patents 4,765,109; 4,889,310; and 4,916,879 with two additional patent applications pending. The technology is in the growth stage of market deployment. At a 10% growth rate, the technology could save a cumulative total of 3 trillion Btu nationwide through 2010.

The U.S. housing market represents over 1 million new homes constructed each year; more than 50% have a basement or crawlspace. In addition to concrete basements and crawl spaces, the technology has recently been extended to decks and light commercial walls for above-grade construction, replacing some conventional construction systems.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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